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TOWNSEND AND TOWNSEND AND CREW, LLP (018563)			SHARON, AYAL I	
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DATE MAILED: 10/04/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 10/670,162	Applicant(s) PAVLOVSKAIA ET AL.	
	Examiner Ayal I. Sharon	Art Unit 2123	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 14 July 2006.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-15 and 17-27 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-15 and 17-27 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 9/23/2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date <u>9/20/2004</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Introduction

1. Claims 1-15 and 17-27 of U.S. Application 10/670,162, originally filed on 09/23/2003, are currently pending.
2. This application is a continuation of U.S. Application 10/241,240, now U.S. Patent 6,665,570, filed on 9/10/2002, which is a continuation of U.S. Application 09/506,419, now U.S. Patent 6,463,344, filed on 02/17/2000.
3. New art rejections have been applied. This action is Non-Final.

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.
5. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later

Art Unit: 2123

invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

6. The prior art used for these rejections is as follows:

- a. U.S. Patent 5,975,893 to Chishti et al. ("**Chishti**").
- b. U.S. PG-PUB 2005/0018885 to Chen et al. ("**Chen**").
- c. Yamani, S.M. et al. "A System for Human Jaw Modeling Using Intra-Oral Images". Proc. of the 20th Annual Conf. of the IEE Eng'g in Medicine and Biology Society. Nov.1, 1998. Vol.2, pp.563-566. ("**Yamani**").

7. The claim rejections are hereby summarized for Applicant's convenience. The detailed rejections follow.

8. Claims 1-3, 9-15, and 17-23 are rejected under 35 U.S.C. 103(a) as being unpatentable over Chishti in view of Chen.

9. In regards to Claim 1, Chishti teaches the following limitations:

1. *(currently amended) A computer-implemented method for generating a computer model of one or more teeth, comprising:*

receiving as input a digital data set of meshes representing the teeth;

(See Chishti, especially: col.9, line 43 to col.10, line 7)

creating inside and outside meshes by determining an intersection between a tooth mesh and a cutter mesh;

(See Chishti, especially: col.11, line 58 – col.12, line 8; and Fig.4 and Fig.4A)

... displaying the compressed digital data set.

(See Chishti, especially: col.11, line 58 – col.12, line 8; and Fig.4 and Fig.4A)

However, while Chishti teaches representing "parallel set of digital data set ... at a lower resolution" (See Chishti at col.10, lines 52-56.), Chisti does not expressly teach the following limitation:

compressing the digital data set; and

Chen, on the other hand, teaches two ways in which data can be compressed: first, "an optimization process ... to refine the 2D meshes" (See Chen, paragraph [0183]), and second, the use of Bezier surface curves to generate "meshes of arbitrary refinement." (See Chen, paragraph [0186]).

At the time of the invention, it would have been obvious to a person of ordinary skill in the art to modify the teachings of Chishti with those of Chen to compress the image data.

The motivation for combining the references would have been to increase efficiency (see paragraph [0183]).

Therefore, it would have been obvious to a person of ordinary skill in the art to modify Chishti with Chen to obtain the invention as specified in Claim 1.

10. In regards to Claim 2, Chishti teaches the following limitations:

2. *(currently amended) The method of claim 1, wherein a parametric representation of the digital data set is created before compressing the data.*

(Chishti, especially: col.10, lines 52-56.)

Examiner interprets that the "parallel set of digital data set ... at a lower resolution" corresponds to the claimed "compressed digital representation."

11. In regards to Claim 3, Chishti teaches the following limitations:

3. *(previously presented) The method of claim 1, further comprising storing the compressed data in a file.*

(Chishti, especially: col.10, lines 52-56.)

Examiner interprets that the "digital data set" corresponds to a file

12. In regards to Claim 9, Chishti teaches the following limitations:

9. *(previously presented) The method of claim 2, wherein creating a parametric representation further comprises generating a curve network.*

(See Chishti, especially: col.11, line 58 – col.12, line 8; and Fig.4 and Fig.4A)

Examiner interprets that the "two cubic B-spline curves" correspond to a curve network.

13. In regards to Claim 10, Chishti teaches the following limitations:

10. *(previously presented) The method of claim 9, further comprising fitting the curve network to the digital data set.*

(See Chishti, especially: col.10, lines 29-48; and col.11, line 58 – col.12, line 8; and Fig.4 and Fig.4A)

Examiner interprets that the "two cubic B-spline curves" correspond to a curve network.

14. In regards to Claim 11, Chishti teaches the following limitations:

11. *(previously presented) The method of claim 1, wherein receiving the digital data set comprises receiving data obtained by scanning a physical model of the teeth.*

(See Chishti, especially: Fig.2; and col.9, line 14 to col.10, line 7)

15. In regards to Claim 12, Chishti teaches the following limitations:

12. *(previously presented) The method of claim 1, further comprising scanning a physical model of the teeth with a destructive scanning system.*

(See Chishti, especially: Fig.2; and col.9, line 14 to col.10, line 7)

Examiner interprets that a "contact-type scanner" corresponds to the claimed "destructive scanning system."

16. In regards to Claim 13, Chishti teaches the following limitations:

13. *(previously presented) The method of claim 12, further comprising scanning the physical model with a laser scanning system before scanning the model with the destructive scanning system.*

(See Chishti, especially: Fig.2; and col.9, line 14 to col.10, line 7)

Examiner interprets that a "contact-type scanner" corresponds to the claimed "destructive scanning system", and a "non-contact scanner" corresponds to a laser scanner.

17. In regards to Claim 14, Chishti teaches the following limitations:

14. *(previously presented) The method of claim 13, further comprising scanning physical models of a patient's upper and lower teeth in occlusion with the laser scanning system before scanning with the destructive scanning system.*

(See Chishti, especially: Fig.2; and col.9, line 14 to col.10, line 7)

Examiner interprets that a "contact-type scanner" corresponds to the claimed "destructive scanning system", and a "non-contact scanner" corresponds to a laser scanner.

18. In regards to Claim 15, Chishti teaches the following limitations:

15. *(previously presented) The method of claim 1, wherein the digital data set includes volume image data of the teeth and the method includes converting the volume image data into a 3D geometric model of the tooth surfaces.*

(See Chishti, especially: Fig.2; and col.9, line 14 to col.10, line 7)

19. In regards to Claim 17, Chishti teaches the following limitations:

17. *(currently amended) The method of claim 17, further comprising joining the inside and outside meshes to create a closed surface for each of the individual teeth.*

(See Chishti, especially: Fig.2; and col.9, line 14 to col.10, line 7)

20. In regards to Claim 18, Chishti teaches the following limitations:

18. *(previously presented) The method of claim 1, further comprising rendering a three-dimensional (3D) graphical representation of the individual teeth.*

(See Chishti, especially: Fig.2; and col.9, line 14 to col.10, line 7)

21. In regards to Claim 19, Chishti teaches the following limitations:

19. *(previously presented) The method of claim 18, further comprising receiving an instruction from a human user to modify the graphical representation of the teeth and modifying the graphical representation in response to the instruction.*

(See Chishti, especially: col.10, lines 29-48; and col.11, line 58 – col.12, line 8; and Fig.4 and Fig.4A)

Examiner interprets that the “two cubic B-spline curves” correspond to a curve network.

22. In regards to Claim 20, Chishti teaches the following limitations:

20. *(previously presented) The method of claim 18, further comprising modifying the selected data set in response to the instruction from the user.*

(See Chishti, especially: col.10, lines 29-48; and col.11, line 58 – col.12, line 8; and Fig.4 and Fig.4A)

Examiner interprets that the “two cubic B-spline curves” correspond to a curve network.

23. In regards to Claim 21, Chishti teaches the following limitations:

21. *(previously presented) The method of claim 1, further comprising delivering data representing positions of the teeth at selected points along treatment paths to an appliance fabrication system for use in fabricating at least one orthodontic appliance structured to move the teeth toward a final position for the teeth.*

(See Chishti, especially: col.7, line 65 to col.9, line 14; and Figs.1A, 1B, and 1C)

24. In regards to Claim 22, Chishti teaches the following limitations:

22. *(currently amended) The method of claim 1, further comprising storing the compressed data set as a 3D geometric model representing visible surfaces of the corresponding tooth.*

(Chishti, especially: col.10, lines 52-56.)

Examiner interprets that the "parallel set of digital data set ... at a lower resolution" corresponds to the claimed "compressed digital representation."

25. In regards to Claim 23, Chishti teaches the following limitations:

23. *(previously presented) The method of claim 22, further comprising modifying each 3D model to include hidden surfaces of the corresponding tooth.*

(Chishti, especially: col.10, line 48 to col.11, line 38.)

26. Claims 4-8 are rejected under 35 U.S.C. 103(a) as being unpatentable over Chishti in view of Chen and further in view of Official Notice.

27. In regards to Claim 4, Chishti teaches the following limitations:

4. *(previously presented) The method of claim 1, further comprising transmitting the compressed data to a remote computer.*

Official Notice is taken that transmitting compressed data to a remote computer was old and well known at the time the invention was made in the analogous art of U.S. Patent 6,227,850 to Chisti (See Fig.20), and U.S. Patent 6,044,170 to Migdal et al. (see col.4, lines 10-30).

At the time of the invention, it would have been obvious to a person of ordinary skill in the art to transmit compressed data to a remote computer, in order to enable work to be performed in remote locations, to facilitate the sharing of information between different computers and employees, etc.

The motivation for combining the references would have been to enable the data to be stored, viewed, or modified, on a different computer, and to do so with compressed data in order to minimize the use of bandwidth on the communications medium.

Therefore, it would have been obvious to a person of ordinary skill in the art to modify Chishti and Chen to obtain the invention as specified in Claim 4.

28. In regards to Claim 5, Chishti teaches the following limitations:

5. *(previously presented) The method of claim 4, further comprising displaying the compressed data on the remote computer.*

Official Notice is taken that displaying compressed data on the remote computer was old and well known at the time the invention was made in the analogous art of U.S. Patent 6,227,850 to Chisti (See Fig.20), and U.S. Patent 6,044,170 to Migdal et al. (see col.4, lines 10-30).

At the time of the invention, it would have been obvious to a person of ordinary skill in the art to display compressed data to a remote computer, in order to enable work to be performed in remote locations, to facilitate the sharing of information between different computers and employees, etc.

The motivation for combining the references would have been to enable the data to be stored, viewed, or modified, on a different computer, and to do so with compressed data in order to minimize the use of bandwidth on the communications medium.

Therefore, it would have been obvious to a person of ordinary skill in the art to modify Chishti and Chen to obtain the invention as specified in Claim 5.

29. In regards to Claim 6, Chishti does not expressly teach the following limitation:

6. *(previously presented) The method of claim 4, wherein the compressed data are transmitted over a network.*

Official Notice is taken that transmit compressed data over a network was old and well known at the time the invention was made in the analogous art of U.S. Patent 6,227,850 to Chisti (See Fig.20), and U.S. Patent 6,044,170 to Migdal et al. (see col.4, lines 10-30).

At the time of the invention, it would have been obvious to a person of ordinary skill in the art to transmit compressed data over a network, in order to enable work to be performed in remote locations, to facilitate the sharing of information between different computers and employees, etc.

The motivation for combining the references would have been to enable the data to be stored, viewed, or modified, on a different computer, and to do so with compressed data in order to minimize the use of bandwidth on the communications medium.

Therefore, it would have been obvious to a person of ordinary skill in the art to modify Chishti and Chen to obtain the invention as specified in Claim 6.

30. In regards to Claim 7, Chishti teaches the following limitations:

7. *(previously presented) The method of claim 6, wherein the network is a wide area network.*

Official Notice is taken that transmitting compressed data over a wide area network was old and well known at the time the invention was made in the analogous art of U.S. Patent 6,227,850 to Chisti (See Fig.20), and U.S. Patent 6,044,170 to Migdal et al. (see col.4, lines 10-30).

At the time of the invention, it would have been obvious to a person of ordinary skill in the art to transmit compressed data over a wide area network, in

order to enable work to be performed in remote locations, to facilitate the sharing of information between different computers and employees, etc.

The motivation for combining the references would have been to enable the data to be stored, viewed, or modified, on a different computer, and to do so with compressed data in order to minimize the use of bandwidth on the communications medium.

Therefore, it would have been obvious to a person of ordinary skill in the art to modify Chishti and Chen to obtain the invention as specified in Claim 7.

31. In regards to Claim 8, Chishti teaches the following limitations:

8. *(previously presented) The method of claim 6, wherein the network is the Internet.*

Official Notice is taken that transmitting compressed data over the internet was old and well known at the time the invention was made in the analogous art of U.S. Patent 6,227,850 to Chisti (See Fig.20), and U.S. Patent 6,044,170 to Migdal et al. (see col.4, lines 10-30).

At the time of the invention, it would have been obvious to a person of ordinary skill in the art to transmit compressed data over the internet, in order to enable work to be performed in remote locations, to facilitate the sharing of information between different computers and employees, etc.

The motivation for combining the references would have been to enable the data to be stored, viewed, or modified, on a different computer, and to do so with compressed data in order to minimize the use of bandwidth on the communications medium.

Therefore, it would have been obvious to a person of ordinary skill in the art to modify Chishti and Chen to obtain the invention as specified in Claim 8.

32. Claims 24-26 are rejected under 35 U.S.C. 103(a) as being unpatentable over Chishti in view of Chen, and further in view of Yamani.

33. In regards to Claim 24, Chishti teaches the following limitations:

24. (currently amended) A computer-implemented method for generating a computer model of one or more teeth, comprising:

receiving as input a digital data set of meshes representing the teeth;

(See Chishti, especially: col.9, line 43 to col.10, line 7)

compressing the digital data set;

(Chishti, especially: col.10, lines 52-56.)

Examiner interprets that the "parallel set of digital data set ... at a lower resolution" corresponds to the claimed "compressed digital representation."

displaying the computer model of the teeth using a parametric representation;

(See Chishti, especially: col.11, line 58 – col.12, line 8; and Fig.4 and Fig.4A)

rendering a three-dimensional (3D) graphical representation of the individual teeth; and allowing a human user to select a tooth in the graphical representation and, in response, displaying information about the tooth.

(See Chishti, especially: col.6, lines 38-49)

However, Chishti does not expressly teach the following limitation:

receiving an input signal from a 3D gyroscopic input device controlled by a human user and using the input signal to alter an orientation of the teeth in the graphical representation;

Yamani, on the other hand, does expressly teach this limitation (see Yamani, Fig.4).

At the time of the invention, it would have been obvious to one of ordinary skill in the art to modify the teachings of Chen, Ohazama, and Bourke with those of Yamani, to view the anatomical object (in this case, teeth) from different angles.

The suggestion for doing so is Yamani's teaching that "such a model will be a tremendous asset in dental training and teaching." (Yamani, p.564, first paragraph).

Therefore, it would have been obvious to combine Chen with Yamani to obtain the invention as specified in claim 24.

34. In regards to Claim 25,

25. (previously presented) The method of claim 24 wherein rendering the graphical representation comprises rendering the teeth at a selected one of multiple viewing orthodontic-specific viewing angles.

Claim 25 is rejected on the same grounds as claim 24.

35. In regards to Claim 26,

26. (previously presented) The method of claim 24, further comprising providing a user interface through which a human user can provide text-based comments after viewing the graphical representation of the teeth.

Claim 26 is rejected on the same grounds as claim 24.

36. **Claim 27 are rejected under 35 U.S.C. 103(a) as being unpatentable over**

Chishti in view of Chen and further in view of Yamani and further in view of Official Notice.

37. In regards to Claim 27, Chishti does not expressly teaches the following limitations:

27. (previously presented) The method of claim 24, wherein rendering the graphical representation comprises downloading data to a remote computer at which a human user wishes to view the graphical representation.

Official Notice is taken that downloading data at a remote computer was old and well known at the time the invention was made in the analogous art of U.S. Patent 6,227,850 to Chisti (See Fig.20), and U.S. Patent 6,044,170 to Migdal et al. (see col.4, lines 10-30).

At the time of the invention, it would have been obvious to a person of ordinary skill in the art to download data at a remote computer, in order to enable work to be performed in remote locations, to facilitate the sharing of information between different computers and employees, etc.

The motivation for combining the references would have been to enable the data to be stored, viewed, or modified, on a different computer, and to do so with compressed data in order to minimize the use of bandwidth on the communications medium.

Therefore, it would have been obvious to a person of ordinary skill in the art to modify Chishti, Chen and Yamani to obtain the invention as specified in Claim 27.

Response to Amendment

Claim Objections

38. Applicants' amendment to Claim 17 has overcome the objection. The objection has been withdrawn.

Response to Arguments

39. Applicant's arguments with respect to claims 1-28 have been considered but are moot in view of the new ground(s) of rejection.
40. Applicant's arguments, see pp.6-9 of Applicants' remarks, filed 7/14/2006, with respect to the rejection(s) of claim(s) 1-15 and 17-27 under 35 U.S.C. §§ 102 and 103 have been fully considered and are persuasive. Therefore, the rejection has been withdrawn. However, upon further consideration, a new ground(s) of rejection is made in view of the newly cited references.

Conclusion

41. The following prior art, made of record and not relied upon, is considered pertinent to applicant's disclosure.
42. U.S. PG-PUB 2003/0156111 to Joshi et al. (Teaches the use of spline curves in 3D modeling at paragraph [0042]).
43. U.S. PG-PUB 2004/0189633 to Sederberg. (Too recent to apply as prior art, yet the background of the invention cites relevant prior art in the field of spline curves used for 3D imaging).
44. U.S. Patent 6,260,000 to Karasaki et al. (Teaches 3D topographical modeling and cutting of cross-sections, especially in figures 6-11).

Correspondence Information

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Ayal I. Sharon whose telephone number is (571) 272-3714. The examiner can normally be reached on Monday through Thursday, and the first Friday of a bi-week, 8:30 am – 5:30 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Paul Rodriguez can be reached at (571) 272-3753.

Any response to this office action should be faxed to (571) 273-8300, or mailed to:

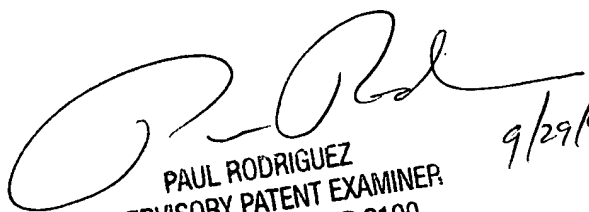
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Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the Tech Center 2100 Receptionist, whose telephone number is (571) 272-2100.

Ayal I. Sharon
Art Unit 2123
September 29, 2006


PAUL RODRIGUEZ
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 2100
9/29/06